



fuzzyfaers: Automated capture of FAERS records for non-standardised drug names

Problem:

- Adverse events in FAERS (FDA Adverse Event Reporting System) use a standard classification (preferred term level labels of the Medical Dictionary for Regulatory Activities, MedDRA),
- However, the drug name field is entered as *free text which can lead to misclassification of medicines.*

Solution:

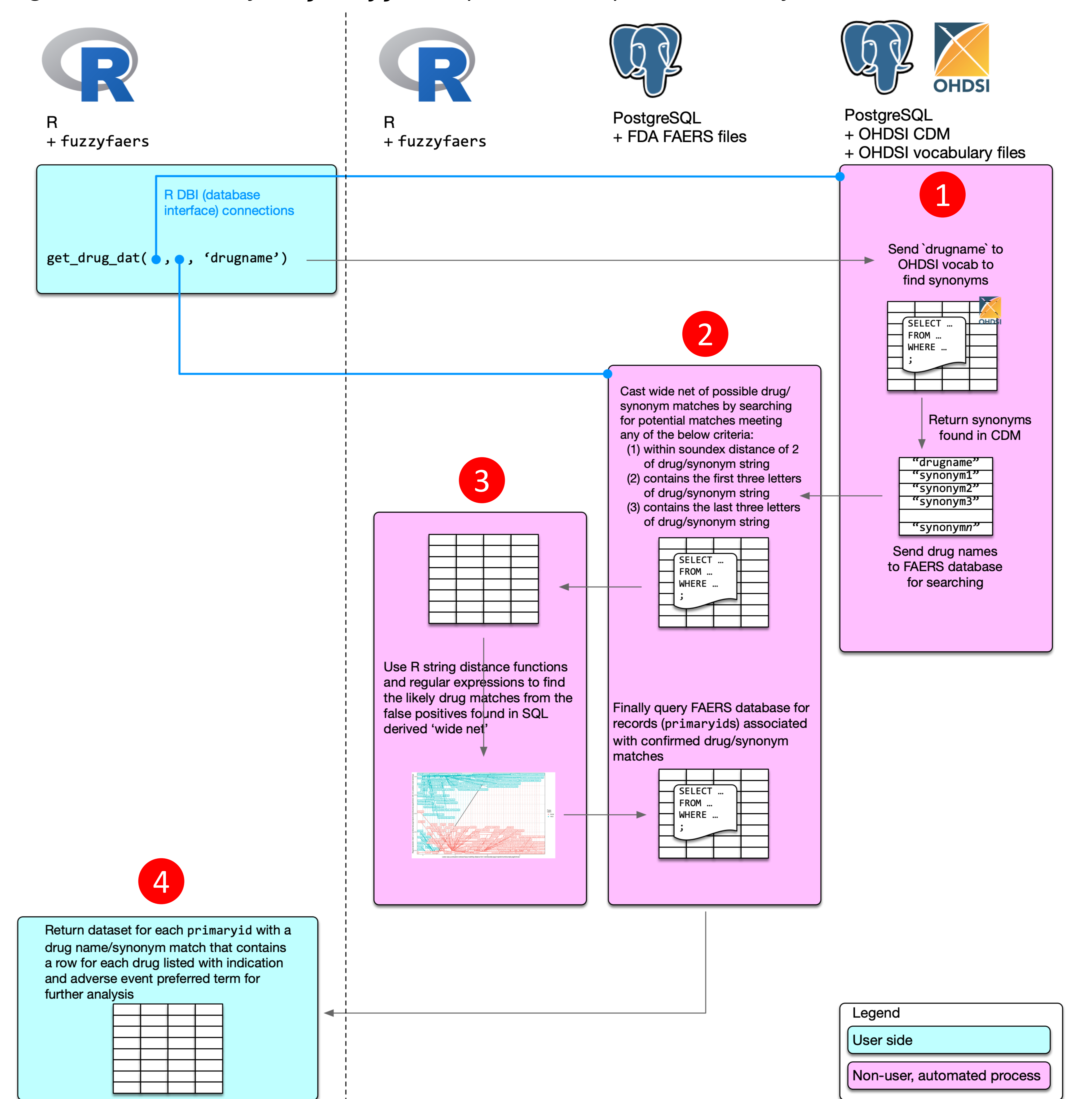
- Automatically capture all records pertaining to a particular medicine, including generic and branded synonyms, misspellings and included superfluous text.
- We present an R package, fuzzyfaers, that performs a sequence of automated steps to extract medicines records from FAERS using fuzzy string matching (*Figure 1*):

- establish drug synonyms in a freely available medicine vocabularies available from OHDSI,
- query FAERS to shortlist potential drug representations using a non-restrictive criteria (soundex similarity and substring matches)
- assess shortlist using classification boundaries based on regular expressions and string similarity distance.
- Expert review of matches and non-matches

Conclusion:

fuzzyfaers successfully automated drug record capture in FAERS with minimal human intervention. This process will help to improve the accuracy of potential ADR analyses using FAERS.

Figure 1: schematic of the fuzzyfaers process to capture records of relevant medicine records



Example: *rituximab*

- Automatically found synonyms: *ruxience, mabthera, rituxan* and *truxima*.
- 544,914 unique drug name entries in FAERS for the period 2013-2020:
 - 227,805 (42%) were shortlisted for fuzzy matching.
- Of the 279 unique presumptive representations of rituximab identified by fuzzyfaers expert review found one false negative and four false positive classifications
- Sensitivity and specificity of fuzzyfaers identifying rituximab records were both greater than 99.6%.

Impact: standardising FAERS data will providing a more robust and speedier process for drug-outcome adverse event screening for clinical practice.

The fuzzyfaers package is available at github.com/tystan/fuzzyfaers